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Residential Air Conditioning Fires

Federal Emergency Management Agency
United States Fire Administration
National Fire Data Center
Emmitsburg, Maryland 21727

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FINDINGS

- Each year, an average of 2,300 residential air conditioning fires cause $23.8 million in damage.
- Residential A/C fires result in less injury (60/year) and death (about 5/year) than other residential fires.
- 75% of A/C fires occur in one- and two-family dwellings. More than half of these fires are from either portable or fixed local A/C units.
- 86% of A/C fires are caused by mechanical failure or malfunction; half of these are from short circuits.
- A/C fires peak from 4 to 5 p.m., the time when the demand for air conditioning is at its highest.

Each year in the United States, an average of 2,300 air conditioning fires occur in residential structures. These fires are responsible for approximately 60 civilian injuries, less than 5 civilian deaths, and $23.8 million in property loss.[1] As of 1997, nearly three-quarters (72 percent) of all American households had air conditioners or air conditioning systems. Forty-seven percent of all households have central air conditioning systems and 25 percent have window/wall air conditioning units.[2]

This topical report examines some of the major characteristics of residential air conditioning fires.

Loss Measures

Data from the National Fire Incident Reporting System (NFIRS) (1996–1998) (Figure 1) show that dollar loss from residential air conditioning fires is slightly lower than that averaged across all residential structure fires. Residential air conditioning fires tend to result in significantly less injury and death than other residential fires.

Figure 1. Loss Measures for Air Conditioning Fires

(3-year average (1996–98) from NFIRS data)

MEASURE	ALL RESIDENTIAL STRUCTURE FIRES	AIR CONDITIONING FIRES*
Dollar Loss/Fire	$11,271	$10,558
Injuries/1,000 Fires	48.0	27.8
Fatalities/1,000 Fires	7.7	0.5

*In residential structures.

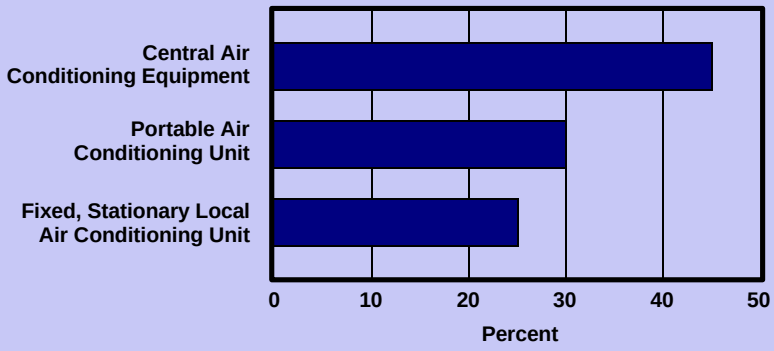
Equipment Involved in A/C Fires

The term *air conditioning fires* applies to those fires in which central air conditioning units, fixed local air conditioning units, or portable local air conditioning units were identified as the equipment involved in the ignition of the fire. Figure 2 illustrates the proportions of the air conditioner systems involved in these fires.

Central air conditioning equipment fires are more common in apartments (58%); portable air conditioner and fixed local air conditioner equipment (window and wall units) fires are more common in one- and two-family dwellings (also 58%).

Figure 2. Leading Equipment Involved in Air Conditioning Fires

(residential structures, 3-year average (1996–98) from NFIRS data)



Where Do A/C Fires Start?

The majority of residential air conditioning fires occur in one- and two-family dwellings (75%) (Figure 3). Another 20% of these fires occur in apartments, with the remaining 5% occurring in other residential occupancies such as dormitories and boarding houses.

Overall, the bedroom (23%) and the lounge area (14%) are the leading areas where these fires originate in residential structures. These are the areas where window or wall units are most commonly found.

Time of Day

The majority of residential air conditioning fires occur in the late afternoon, with the peak time between 4 and 5 p.m. when outside temperatures peak and the demand for air conditioning is at its highest. It is not unusual for air conditioning units to be at full power at this time. Figure 4 illustrates the increase of these fires in the late afternoon hours of the day. The incidence of air conditioning fires decreases during the late evening and overnight hours. The lowest incidence of air conditioning fires occurs in the early morning hours before dawn when the air temperature is generally at its lowest.

What Ignites the Fire?

Eighty-six percent of residential air conditioning fires are ignited as a result of some type of mechanical failure or malfunction. The leading factors contributing to these mechanical failures and malfunctions is a short circuit (51%) or other electrical failure (22%) in the air conditioning unit. In many cases, air conditioner units run at full capacity during the hottest summer months and are not always routinely inspected or maintained, often causing the mechanical failures or malfunctions that result in fire.

Figure 3. Air Conditioning Fires by Residential Type

(residential structures, 3-year average (1996–98) from NFIRS data)

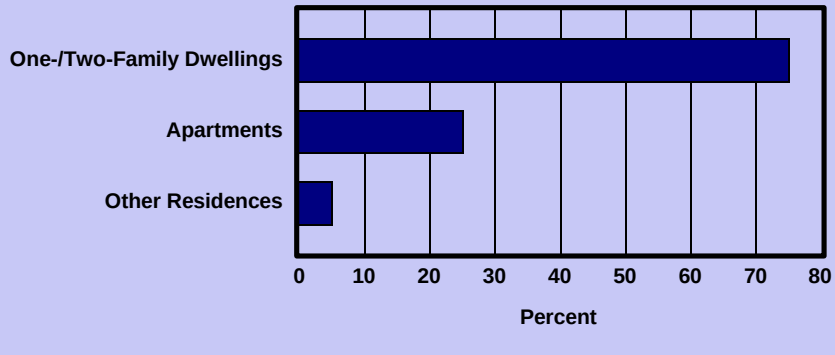
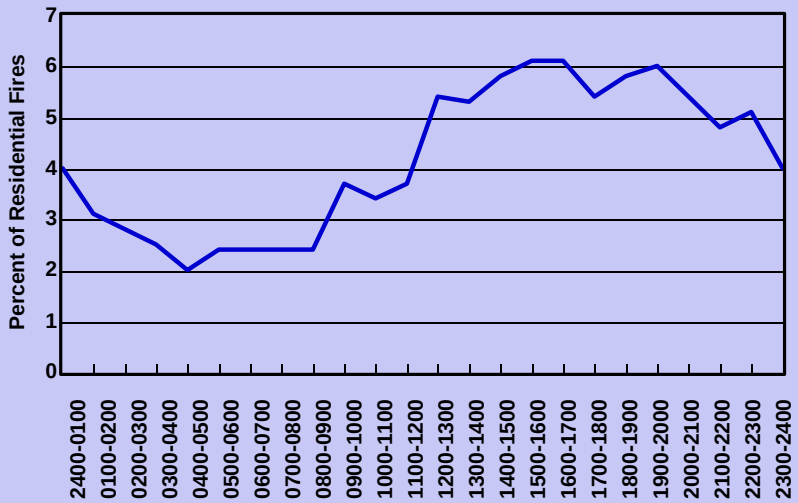


Figure 4. Air Conditioning Fires by Time of Day
(residential structures, 3-year average (1996–98) from NFIRS data)



- An air conditioner overheated in a Brooklyn, New York, apartment July 23, 2001, igniting a sofa and ultimately killing two adults. Their 3-year-old son was spared because his father put him in a water-filled bathtub.[5]

Conclusion

Product maintenance, routine inspection, and the installation of smoke alarms can aid in the prevention or reduction of these fires. For further information on air conditioning fires, contact your local fire department or the USFA.

Examples

- Firefighters fought a blaze in New Jersey late April, 2000 but were unable to save three residents. The fire was began when an undersized air conditioner overheated. The fire had been smoldering for hours before the firefighters arrived on the scene.[3]

- In June 2000, a fire broke out in Augusta, Maine, in the early morning. The residents of the home escaped. The cause of the fire was determined to be an air conditioner that overheated, setting the carpet and furniture on fire.[4]

To review the detailed methodology used in this analysis, click **METHODOLOGY**

Footnotes:

1. National estimates are based on National Fire Incident System (NFIRS) data (1996–1998) and the National Fire Protection Association's (NFPA) annual survey, *Fire Loss in the United States*.
2. "1997 Residential Energy Consumption Survey," Energy Information Administration. See also *http://www.ela.doe.gov/emeu/consumptionbriefs/recs/aircond_use.html.*
3. *Firehouse Magazine*, April 24, 2001.
4. *Augusta Chronicle*, June 14, 2000.
5. *New York Post*, July 24, 2001.